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Statement of Basis

Proposed Remedy Selection for Groundwater

At

Former Witco Corporation Facility
(Now known as Former Chemtura Corporation Facility)
EPA ID # CAD 009137779

850 Morton Avenue / 3655 Collins Avenue
Richmond, California 94806
Contra Costa County

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1. Introduction

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has prepared this Statement of Basis (SB) to discuss the proposed remedy selection for groundwater at the Former Witco Corporation Facility (now known as "Chemtura Corporation" or "Chemtura" or "Facility" or "Site" or Property") located at 850 Morton Avenue/3655 Collins Avenue in Richmond, Contra Costa County, California (see Figure 1, Site Location). The Facility was first owned and operated by U.S. Peroxygen Corporation in 1957, and then it was sold to Argus Chemical Corporation (Argus) in 1964. In 1965, Witco Corporation acquired Argus. In 1989, Witco Corporation terminated all manufacturing operations at the Facility. In 1999, Witco Corporation changed its name to CK Witco Corporation. On October 15, 1999, the Property was sold to Durkee Properties, LLC (Durkee Properties) with Witco retaining the responsibility to clean up the Site. In 2000, CK Witco Corporation changed its name to Crompton Corporation. In 2005, Crompton Corporation changed its name to Chemtura Corporation. Since 1999, the Site has been redeveloped with the construction of a new warehouse and demolition of the old structures.

DTSC is issuing this SB as part of its public participation responsibilities under Chapter 6.5, California Health and Safety Code, Hazardous Wastes Control Act. The corrective action process conducted at the Site addressed releases of hazardous waste and hazardous constituents at the Site. The Corrective Action Consent Agreement ("Consent Agreement") between Chemtura (Witco's successor) and DTSC defined the steps and corresponding scope of work for federal Resource Conservation and Recovery Act (RCRA) corrective action with respect to the irregularly shaped 8 acres of land now owned by Durkee Properties, LLC.

This SB summarizes the remedial alternative analyzed for this Site. DTSC will select a final remedy for the Site only after the public comment period has ended and any information submitted during this time has been reviewed and considered. This SB also summarizes information that can be found in great detail in the Corrective Measures Study Report (CMS) dated May 26, 2005 and the Land Use Covenant Implementation & Enforcement Plan (LUC I&E Plan). Additional detail can be found in other documents in order to gain a more comprehensive understanding of the Facility and corrective action activities that have been conducted at the Site.

In addition to this SB, DTSC has prepared the following documents as part of the public review process to facilitate public comments on the CMS and LUC I&E Plan prior to making a decision to approve the final remedy.

- Fact Sheet that summarizes the proposed remedies selected and provides a notice of public comment period.
- Notice of Exemption which is an environmental analysis under the California Environmental Quality Act (CEQA).

DTSC may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives. The public can be involved in the remedy selection process by reviewing the documents during the 45-day public comment period which begins on August 11**,** 2006 and ends on September 26**,** 2006. Once a final decision is made on the proposed remedy, Chemtura would be required to implement the selected remedy for groundwater associated with historical chemical releases.

2. Proposed Remedies for Groundwater

DTSC is proposing the following remedies for the residual contamination of tetramethyltetrahydrofuran (TMTHF) and benzene in the groundwater beneath the Site:

- Dual Phase vapor extraction for 12 to 18 months at an area in between former Ponds 1 and 2. Dual phase extraction relies on the use of relatively short-term vapor and groundwater extraction using negative pressure extraction techniques to remove volatile contaminant mass from soil and groundwater. Under this method, the extracted groundwater will be discharged to the sanitary sewer under a permit from the San Francisco Regional Water Quality Control Board (RWQCB). The extracted vapors will be treated by carbon absorption and the treated air discharged to the atmosphere under a permit from the Bay Area Air Quality Management District (BAAQMD

- Periodic groundwater confirmation sampling to confirm that TMTHF levels are below the cleanup goal of 2300 ppb.

- Monitoring the natural attenuation of benzene to verify that benzene is approaching or below the cleanup goal of 1 ppb.

- Monitoring the site for an additional five years to gather sufficient information to justify termination of groundwater monitoring at the site.

- Current landowner entering a Land Use Covenant with DTSC to have an annual inspection of Site to ensure that future land use remains industrial and that no drinking water wells are installed onsite.

A more detailed discussion of the proposed remedies is included in sections 9 and 10 of this SB.

3. Facility Background

3.1 Facility Location

The Site is located at 850 Morton Avenue/3655 Collins Avenue in Richmond, Contra Costa County, California and identified by Assessor's Parcel Number 408-060-012. The Site occupies an irregularly shaped eight acres of land located in an industrial area with a nearby residential area to the north, known as Parchester Village. The Site is zoned for light industrial activities and can be accessed from Collins Avenue. Morton Avenue separates the area zoned for residences and the area zoned for light industrial activities. The nearest residence is approximately 50 feet from the facility boundary on Morton Avenue (See Figure 1, Site Location).

Part of the Site is bordered by the Reaction Products Company and Morton Avenue to the north, the former Atlas Foundry, an unused industrial property (Beazer Property) and Collins Avenue to the east, the former Dennison Property to the south, which is now developed and occupied by small businesses known as By-Pass Business 93, and the Southern Pacific Railroad right-of -way to the west. San Pablo Bay is located approximately one third of a mile west of the Site adjacent to the former Breuner Property and about one mile south of Point Pinole (see Figure 1, Site Location).

3.2 Facility Operational History

The Facility was first owned and operated by U.S. Peroxygen Corporation in 1957 and then it was sold to Argus Chemical Corporation (Argus) in 1964. In 1965, Witco Corporation acquired Argus. The Facility manufactured chemicals such as peroxyesters, a product used in the production of plastics; and benzoyl peroxide paste, a product used in cosmetic facial cream. In 1989, Witco Corporation terminated all manufacturing operations at the Facility. In 1999, Witco Corporation changed its name to CK Witco Corporation. In 2000, CK Witco Corporation changed its name to Crompton Corporation. In 2005, Crompton Corporation changed its name to Chemtura Corporation.

The manufacturing processes generated hazardous wastes which were managed in containers, tanks, and ponds. Wastewater containing hazardous constituents such as TMTHF was generated at the Facility. At the time, the wastewater was held in two unlined ponds, identified as Ponds 1 and 2, and neutralized before being discharged. Because of the operation of hazardous waste storage and treatment units, the Facility submitted a Part A Application to U.S. Environmental Protection Agency (EPA) and the Department of Health Services (DHS, DTSC predecessor) to comply with Resource Conservation and Recovery Act (RCRA). In May 1981, the Department of Health Services (now DTSC) issued an Interim Status Document (ISD) to the Facility. The hazardous waste management units covered under the ISD were: (1) Pond 1, (2) Pond 2, (3) the Old Wastewater Treatment Plant (Formic Acid Pretreatment Tank),

(4) the Filter Aid Mixing Vessel, (5) the Former Pressurized Leaf filter, and (6) the Former Caustic pH Adjustment Tank.

In 1986, the Facility began closure of Ponds 1 and 2 by removing wastewater from the ponds. Sludge in the ponds was dried and excavated until it reached the shallow groundwater, about 7 to 9 feet below ground surface. Approximately 1,400 cubic yards (cu yd) of soil and 1,000 cu yd of sludge materials in and around the former ponds were excavated and removed from the Site. The excavation pits were backfilled with clean soil and covered with an engineered cap that consisted of sloped low-permeability bentonite clay (barrier layer), gravel (drainage layer), top soil and native grass (cover layer).

In 1987, DHS certified the closure of the ponds but required the Facility to obtain a Post-Closure Permit because contaminants from the ponds had seeped into the groundwater. The San Francisco Regional Water Quality Control Board (RWQCB) designated the groundwater as a potential source of drinking water. In March 1989, a RCRA Facility Assessment (RFA) was conducted at the Facility and identified all solid waste management units (SWMUs) and areas of concern (AOCs) at the Facility. In December 1989, the Facility ceased its operation at the Site and by March 30, 1990, all related hazardous materials were removed.

On June 25, 1993, the Closure Plan for all the remaining ISD units and SWMUs was approved by DTSC. In December 1993, the Facility completed its closure. The Facility submitted the Closure Report and Certification in March 1994. On April 6, 1994, DTSC certified and approved the clean closure of all ISD units and SWMUs with the exception of Ponds 1 and 2. DTSC required the Facility to obtain a Post-Closure Permit for the former Ponds 1 and 2.

DTSC issued to the Facility a Post-Closure Permit which became effective on April 19, 1993 and an expiration date of April 19, 1998. The Post-Closure Permit required the Facility to monitor the groundwater at the Site, maintain the caps (post-closure care) and implement corrective actions to clean up hazardous contaminants released from the former Ponds 1 and 2. The Post-Closure Permit also required corrective action for all SWMUs and AOCs at the Site. The corrective actions included a RCRA Facility Investigations (RFI) and Corrective Measures Study (CMS), Remedy Selection, and Corrective Action Implementation (see Figure 2, Corrective Action Process Flow Diagram). The Facility was also required to record a notation on the deed to the facility property. On September 7, 1994, a notation that the land had been used to manage hazardous waste was recorded with the County Recorder of Contra Costa County.

On November 5, 1998, DTSC issued a letter to the Facility after re-examining the soil removal action from the former Ponds 1 and 2. The letter stated that:

(1) The caps could be removed,

(2) The post-closure care of the caps covering the former Ponds 1 and 2 may be terminated, and

(3) No further action would be required for the soils at the Site.

The Post-Closure Permit expired in 1998. In 1999, DTSC and the Facility entered into a Consent Order (HWCA P2-98-004) which replaced the expired Post-Closure Permit. The Consent Order required the Facility to continue post-closure care and to complete corrective action investigation and remediation at the Site. The Consent Order also acknowledged the existence of three groundwater plumes in the vicinity of the Site. The groundwater plumes are:

(1) A plume in the groundwater which is primarily contaminated with TMTHF that is associated with previous operations of former Ponds 1 and 2 at the Site. Benzene has also been detected above the Maximum Contaminant Level (MCL) of 1 parts per billion (ppb) in one extraction well in this plume. This is the area between the former Ponds 1 and 2 (see Figure 3, Target Groundwater Remediation Area),

(2) A plume which is primarily contaminated with aromatic volatile organic hydrocarbons (VOCs), mostly xylenes, and chlorinated VOCs in two southeastern areas of the Site, adjacent to the Beazer property and which Witco asserts is not attributable to their previous operations at the Site, and

(3) A plume which is primarily contaminated with chlorinated VOCs in the groundwater in areas north of the Site, adjacent to the Reaction Products property and which Witco asserts is not attributable to their previous operations at the Site.

The Consent Order requires the continuation of groundwater monitoring and completion of the Corrective Action which addresses only the TMTHF and benzene in the plume. The cleanup of groundwater plumes contaminated with chlorinated and aromatic VOCs will be addressed through separate cleanup projects.

On October 15, 1999, the Property was sold to Durkee Properties, LLC, with Witco Corporation's successor, Chemtura Corporation, retaining the responsibility to clean up the Site. The current owner re-developed the Property with the following improvements: (1) a new warehouse approximately 69,000 square feet (sq. ft.), (2) an above-ground fuel tank, (3) paved areas surrounding the new warehouse, and (4) some landscaping on the side of the warehouse and along the fence on the north side of the property boundary. The majority of the Site is currently used for warehouse space and associated loading/unloading and parking activities. The existing 9,600 sq. ft. warehouse and the "shop" building are still at the Site and are being leased for commercial use. For security purposes, the current property owner monitors the Site with cameras.

3.3 Environmental Conditions

The City of Richmond is located in the San Francisco Bay Area, north-northeast of the City of San Francisco and San Francisco Bay. It is approximately 30 square miles in land area. Based on information from the U.S. Census Bureau, the estimated population of Richmond in 2004 was 102,318.

The Site is located on a relatively flat plain that slopes westward at 25 to 40 feet per mile. The elevation on the property ranges from approximately 17 feet above mean sea level (MSL) at the west end of the property to approximately 27 feet above MSL at the east end of the property. Rolling hills, with a maximum elevation of 300 feet above MSL and slopes as steep as 500 feet per mile, are located half a mile east of the Site.

Natural surface water bodies within one mile of the Site include the following:

- San Pablo Bay, located approximately 2000 feet west-northwest of the Site.
- San Pablo Creek, located approximately one mile south of the Site.

Artificial surface water bodies within one mile of the Site include the following:

- Rheem Creek, an engineered drainage ditch located approximately 500 feet south of the southwestern corner of the Site that drains to San Pablo Bay.
- The Richmond Golf Club irrigation reservoir, located approximately 2500 feet northeast of the Site. The water held is reclaimed water from the West Contra Costa Sanitation District used exclusively for landscape irrigation.
- A drainage ditch that runs north-south is located west of the Site between the Site and the railroad tracks which carries stormwater runoff from the Site to Rheem Creek. An NPDES Permit (No. CA0028479) authorized the Facility to discharge stormwater to the railroad drainage ditch.

The geologic material underlying the Site consists of unconsolidated sediments, predominantly silty sand and clay, interpreted as alluvial fan and channel deposits interbedded with onlapping bay mud (organic-rich clay and silt) deposits. The unconsolidated alluvial sediments are reported to have a maximum thickness of 400 feet in the region and are estimated to be approximately 250 feet thick beneath the site. Below the unconsolidated sediments is bedrock. Groundwater at the Site is generally first encountered between 4 and 12 feet below the ground surface (bgs).

Two relatively permeable groundwater zones (upper zone and lower zone) have been identified within the upper 65 feet of soil at the Site. In general, the upper zone occurs between 5 feet and 30 feet below ground surface with an approximate average thickness of 10 feet. The upper and lower zones are separated by a silt and clay unit that is approximately 10 feet thick. In some areas this low permeability unit may be very thin allowing greater hydraulic communication between the more permeable upper and lower zones. The top of the lower zone is located approximately 30 to 45 feet below ground surface, and the unit ranges in thickness from 20 to greater than 35 feet. Groundwater in the area is designated by the RWQCB as a potential source of drinking water. Based on the direction of the groundwater gradient, groundwater in the upper and lower zones monitored at the Site generally flows northwest toward San Pablo Bay.

Surface drainage is ultimately into the San Pablo Bay. Surface and storm water at the Site flows to the west end of the Site where it drains via underground concrete piping to the common storm-drain for the area.

4. RCRA Facility Assessment

In the RCRA Corrective Action Program, the initial site assessment is called the RCRA Facility Assessment (RFA). During the RFA, an overseeing agency typically compiles existing information on environmental conditions at a given facility and, as necessary, gathers additional facility-specific information on solid waste management units and other areas of concern, releases, potential releases, releases pathways, and receptors. A Solid Waste Management Unit (SWMU) means "any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous wastes. Such units include any area at a facility at which solid wastes have been routinely and systematically released." An Area of Concern (AOC) means "any area of a facility under the control or ownership of an owner or operator where a release to the environment of hazardous wastes or hazardous constituents has occurred, is suspected to have occurred, or may occur, regardless of the frequency or duration." Information gathered during the RFA usually forms the basis for initiating full scale site investigation (RCRA Facility Investigation). If the facility poses a threat to human health or the environment, DTSC may require corrective action either by a corrective action order, corrective action consent agreement, or through the facility's permit conditions.

In March 1989, the U.S. EPA completed the RFA for this facility and identified 40 SWMUs which included 6 hazardous waste management units under ISD and 6 AOCs. All 40 SWMUs and 6 AOCs are listed in Table 1 and their locations are shown in Figure 4.

5. RCRA Facility Investigation

The general objective of the RCRA Facility Investigation (RFI) is to thoroughly evaluate the nature and extent of releases of hazardous waste and its constituents. The RFI must include characterization of the facility (process, waste management, etc.), environmental setting, source areas, nature and extent of contamination, migration pathways (transport mechanisms) and potential receptors. The RFI characterizes the nature and extent of any contamination in and around the facility with soil and groundwater samples. The investigation evaluates whether hazardous wastes or hazardous waste constituents have migrated or may migrate from the facility into the environment through the following pathways: soil, groundwater, and air.

The Facility investigated the extent of soil and groundwater contamination at the Site beginning December 1993 under the requirements of the Post-Closure Permit. On December 13, 1993, the Facility submitted the Final RFI Workplan which was approved by DTSC on December 31, 1993. The Final RFI Report, dated May 12, 1995, was submitted to DTSC and was approved by DTSC on May 31, 1995.

Detection of dioxin and dibenzofuran during routine groundwater monitoring between December 2001 and prior to December 2003 warranted an additional investigation for the Site. The findings of the further investigation, presented in a report dated March 31, 2005, concluded that previous dioxin and dibenzofuran groundwater chemistry data collected between December 2001 and prior to December 2003 were likely corrupted by field contamination. Hence, the Facility prepared a Technical Memorandum dated April 29, 2005 to update the RFI eliminating dioxin and dibenzofuran groundwater chemistry data in the calculation of the health risk.

The Facility also investigated off-site soil and groundwater contamination. In 1986, during the drilling of a well (W-22) near the boundary of Reaction Products property line, an underground petroleum pipeline was apparently damaged. The pipeline was excavated and repaired and the contaminated soil was removed immediately after the release. Further investigation concluded that this localized area of impact was within a larger area impacted by chlorinated volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) related to Reaction Products operations and unrelated to Witco activities.

The RFI findings are summarized as follows:

1. On-site groundwater is contaminated with chlorinated solvents from off-site sources - primarily tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC). Several neighboring facilities have been identified as contributing sources of contamination in groundwater at the Site and in the vicinity of the Site.

2. On-site soils had been impacted by VOCs (primarily TMTHF and acetone, with isolated areas of benzene impacts) and to a lesser degree semivolatile organic compounds (SVOCs), as a result of previous operations by the former Witco. They were cleaned up to DTSC-approved health-risk based cleanup levels.

3. A defined plume of TMTHF exists in the shallow groundwater-bearing zone that appears to be related to the previous operations on the Witco site. The portion of TMTHF plume which had migrated off-site decreased to levels considered safe for potential potable use (see Table 2).

4. Contamination in the upper and lower zones of the shallow groundwater system at the Site does not appear to have migrated to deeper groundwater as shown in Table 2.

5. A small plume of benzene near the Southern Pacific Railroad right-of-way was a result of damage to a transmission pipeline containing petroleum hydrocarbon products during the drilling of well W-22. The contaminated soil was removed immediately after the release. The groundwater monitoring results indicated that the benzene levels have been diminishing.

6. The results of surface water sampling indicated that there was no impact to surface waters as a result of prior National Pollution Discharge Elimination System (NPDES) discharges by Witco or other discharges related to current site conditions.

Based on the RFI findings, the Facility was required to prepare a Corrective Measures Study proposing additional corrective action. The contaminants detected in on-site groundwater are provided in Table 3.

6. Interim Remedial Measures

Interim Remedial Measures (IRMs) are actions that can be taken at any time during the corrective action process to reduce or eliminate imminent threats to human health or the environment. These measures are to control, stabilize or eliminate further release(s) or potential release(s) of hazardous wastes or hazardous waste constituents at or from a facility.

The Facility completed the following interim measures which were included in the CMS Report:

1. Installation of groundwater monitoring wells, operation and maintenance of a groundwater extraction system to control plume migration and to reduce concentrations of chemicals of concern in upper-zone groundwater.

   From June 1990 through July 1999, groundwater extraction, using 5 wells, was conducted around former Ponds 1 and 2. One off-site well was added to the extraction system in 1993. A total of approximately 7,978,404 gallons of groundwater containing TMTHF were extracted after nine years of pumping groundwater at an average pumping rate of 1.7 gallons per minute. Approximately 12.22 kilograms (approximately 4.3 gallons) of TMTHF were removed from the extracted groundwater. Groundwater extraction of TMTHF was terminated in 1999 when it appeared that the groundwater extraction system had reached its technical limitation for reducing the concentration of TMTHF and benzene in groundwater. The operation of groundwater extraction system also appeared to have facilitated the transport of groundwater contaminated with chlorinated solvents originating from the former Beazer Property (Well K-9) and former Dennison Property.

2. Removal/closure of all SWMUs and AOCs.

   On June 25, 1993, the Closure Plan for all SWMUs, which included the ISD units, and all AOCs was approved by DTSC. In December 1993, the Facility completed its closure. The closure included the removal of contaminated soil and sampling of soil beneath the SWMUs for possible contamination. A total of approximately 2,070 cubic yards (cu. yds.) of soil were removed from the "hot spot" areas where soil was found to be impacted. Soil was excavated to levels below DTSC-approved health-risk based cleanup levels.

3. Removal of caps over former Ponds 1 and 2.

   On September 16, 1999, DTSC approved a workplan allowing Crompton to remove the caps covering the former Ponds 1 and 2. The caps removal was completed in December 1999. The approval for removing the caps over former Ponds 1 and 2 was based on DTSC's re-examination of the results of confirmation closure soil samples taken from the bottom and sides of the

excavated ponds. The residual concentrations of contaminants in soil were below the DTSC-approved Recommended Soil Cleanup Levels (RSCLs). The RSCLs were developed by considering the Drinking Water Standard, Water Quality Criteria for Non-carcinogenic Effects, Water Quality Criteria for Carcinogenic Effects at 10^{-6} Risk Level, Drinking Water Quality Contaminant Levels for Non-carcinogenic Effects, and Aquatic Toxicity.

7. Summary of Facility Risks

7.1 Human Health Risk Assessment

The primary sources of contaminants associated with Witco's past activities at the Site have been removed by soil excavation and groundwater extraction. Secondary sources of contaminants include chemicals of potential concern (COPCs) in the vadose zone soil and groundwater associated with Witco's former activities as well as from offsite sources not associated with Witco's past activities.

Sampling results showed that TMTHF and benzene are the main contaminants that resulted from previous manufacturing processes at the Facility. TMTHF is a very soluble organic chemical and is not considered a carcinogen. There is no regulatory level established for TMTHF in drinking water. DTSC, therefore, used a surrogate compound (a furan equivalent to TMTHF) to establish a concentration of 2,300 parts per billion (ppb) as its remedial cleanup goal for drinking water. The maximum concentration level (MCL) for benzene in groundwater is 1 ppb. The Site will be cleaned up to these levels.

A site-specific baseline Health Risk Assessment (HRA) was prepared in March 2004 and was amended in May 2005. The HRA was amended to remove dioxin from the list of COPCs. Dioxin was found to be the result of field contamination during sampling rather than residuals from past operational activities. All organic chemicals detected in onsite vadose zone soil and groundwater were included in the risk assessment as COPCs. The COPCs in the HRA are TMTHF, benzene, chlorobenzene, isopropylbenzene, toluene, trichloroethene (TCE), trichloroethane (TCA), phthalate, and some metals which included arsenic and lead. COPCs from offsite sources included tetrachloroethene (PCE) and vinyl chloride (VC) in groundwater and xylenes in soil.

Six hypothetical exposure scenarios and complete exposure pathways evaluated in the HRA are as follows:

- Current On-site Workers exposed to chemicals in the surface soil (soil between 0 and 1 foot below ground surface (bgs) via soil ingestion, particulate inhalation and dermal contact, and to volatile chemicals in the vadose zone soils and shallow groundwater via vapor intrusion into indoor air.

- Future On-site Workers exposed to chemicals in the construction-zone soil (0 to 10 feet bgs) via soil ingestion, particulate inhalation and dermal contact, and to volatile organic compounds (VOCs) in shallow groundwater via vapor intrusion into indoor air.

- Hypothetical On-site Residents exposed to chemicals in the surface soil via soil ingestion, particulate inhalation and dermal contact, and to

chemicals in the shallow groundwater zone and vadose zone soils via vapor intrusion into indoor air.

- Hypothetical On-site Residents exposed to chemicals in the construction-zone soil via indoor air from groundwater.

- Construction Workers exposed to chemicals in the construction-zone soil via soil ingestion, particulate inhalation and dermal contact.

- Hypothetical Groundwater Users exposed to chemicals in the upper and lower groundwater zones via water ingestion and dermal contact and via inhalation of volatile organic chemicals emitted into indoor air as a result of household water use.

The potential lifetime cancer risks and the likelihood of adverse noncancer health effects were evaluated in the HRA based on exposures of hypothetical receptors to COPCs in each medium of concern. The results of the evaluation for potential cancer risks and non-carcinogenic hazard index for each of the hypothetical receptors were summarized in the table below

A hazard quotient (hazard index) equal to or below one suggests that adverse health effects are unlikely to occur. A hazard quotient greater than one does not indicate that adverse health effects will or likely to occur, rather, it suggests that additional evaluation is warranted.

Under the U.S. EPA superfund Regulations (CFR 40, Part 300), cancer risks below 1×10^{-6} are considered *de minimus* and generally do not warrant further evaluation or remediation. DTSC also uses a risk of 1×10^{-6} as the point of departure for risk management decisions. In general, both DTSC and US EPA consider cancer risks above 100×10^{-6} (or 1×10^{-4}) as significant and warrant further consideration and potential remediation.

The results in the table below showed that greater risk exists only if there were onsite residents exposed to surface soil, construction-zone soil and groundwater.

Summary of potential cancer risks and noncarcinogenic hazard index for each hypothetical receptors evaluated in the HRA.			
Hypothetical Receptor and Pathway	**Cancer Risk**	**Hazard Index**	**Remarks**
1 Current onsite workers exposed to surface soil (0 - 1 ft bgs) and indoor air chemicals	6×10^{-7}	1	
2. Future onsite workers exposed to construction zone soil (0 - 10 ft bgs) and indoor air chemicals	2×10^{-6}	0.02	Cancer risk is due to arsenic in soil
3. Hypothetical onsite residents exposed to surface soil and indoor air chemicals	2×10^{-6}	13	Xylene level in vadose zone soil accounted for the noncarcinogenic hazard and benzene in vadose zone soil accounted for the cancer risk
4. Hypothetical onsite residents exposed to construction-zone soil and indoor air chemicals	9×10^{-6}	0.4	Arsenic in construction zone soil accounted for the majority of cancer risk
5. Construction Worker exposed to construction-zone soil chemicals	4×10^{-7}	0.1	
6. Hypothetical onsite residents exposed to chemicals in upper and lower groundwater zones	3×10^{-5}	0.5	For hypothetical groundwater users, cancer risk was associated with exposures to PCE, VC, and benzene

7.2 Ecological Risk Assessment

Potential ecological receptors, including the threatened or endangered species, in the vicinity of the Facility were identified in the RFI report. As part of the RFI, surface water samples were collected from the drainage ditch immediately west and southwest of the Site and a sample of on-site storm water was collected for laboratory analysis. The results of analysis indicated that surface water was not impacted as a result of past discharges from or current conditions of the Facility. Based on the results of groundwater fate and transport modeling presented in the RFI report and due to hydrogeologic conditions, COPCs in groundwater at the Site will not impact San Pablo Bay. This is supported by the results of the pump tests performed at the Site which indicated that there is an impediment to the flow of groundwater between the Site and the bay.

8. Scope of Corrective Action

Due to past removal of soils from all solid waste management units, which included the ponds, and other areas of concern, the soil contamination of TMTHF and benzene at the Site remains below the residential cleanup goals. DTSC has determined that no further action is needed for the soil media at the Site.

In 2003, the concentration of TMTHF in the groundwater rebounded to 2,900 ppb, which is above the health risk-based level of 2,300 ppb established by DTSC. Benzene concentration was detected at 29 ppb at one groundwater monitoring well; this concentration exceeded the health risk-based goal of 1 ppb. As a result, DTSC required the Facility to conduct a Corrective Measure Study (CMS) and required the Facility to propose a remedy to further remediate the TMTHF and benzene in the groundwater at the Site.

9. Summary of Alternatives

The general objective of the Corrective Measure Study (CMS) is to develop and evaluate corrective measure alternative(s) that may be utilized at the Facility to address releases of hazardous waste or constituents from the SWMUs, areas of concern, and other sources areas at the Facility. The information collected during the RFA, RFI and CMS phases will be used to determine which technologies to use during the Corrective Measures Implementations. With adequate forethought during the RFI, certain technologies may be adequately screened or eliminated from the CMS decision process with a minimum outlay of time and expense.

The only corrective measure needed at the site is to address the cleanup of the groundwater in a small area between the former Ponds 1 and 2 in the north-central portion of the Site. In addition to the administrative measure, such as the Land Use Covenant (LUC) to ensure that the Site's land use is not changed, four potential cleanup alternatives are considered for the groundwater.

1. No action - no action evaluates what the potential risks would be if the Site is left in its current state.

2. Monitored natural attenuation with supplemental groundwater extraction - leave the Site in its current state but do some groundwater extraction.

3. Dual-phase extraction - vapor and water are extracted through a pipe placed in the ground.

4. Excavation of soil with supplemental groundwater extraction.

The four potential alternatives are further described below.

9.1 Alternative 1 – No Further Action

The “No Further Action” alternative is required to provide a baseline for comparing other alternatives. This alternative involves no actions to achieve and maintain cleanup goals and does not include continued groundwater monitoring to confirm conditions in the future at the Site. Therefore, this alternative was not considered to be a viable approach for this Facility.

9.2 Alternative 2 – Monitored Natural Attenuation with Supplemental Groundwater Extraction

This alternative combines the use of natural attenuation (natural processes that reduce the concentration and mass of COCs in groundwater) to achieve and maintain cleanup goals and limit future migration of COCs with the groundwater extraction to control plume migration if necessary until natural attenuation processes reduce concentrations below cleanup levels in all areas. Groundwater monitoring and extraction wells already exist at the Site. Extracted groundwater will be discharged to

the publicly owned treatment works (POTW) at the Site as it has been in the past. Once onsite contaminant mass and concentrations are reduced to the point that cleanup goals will not be exceeded at the point of compliance for the Facility and migration is controlled, groundwater extraction is no longer needed. Groundwater extraction will be stopped.

Groundwater will continue to be monitored using existing monitoring wells until it is confirmed that the cleanup goals have been achieved at the Site. Unused groundwater monitoring wells will be properly abandoned in accordance with the requirements of the Contra Costa County Environmental Health Services.

9.3 Alternative 3 – Dual Phase Extraction

This alternative relies on the use of relatively short-term vapor and groundwater extraction using negative pressure extraction techniques to remove volatile contaminant mass from soil and groundwater including capillary-fringe groundwater and groundwater in low permeability soil that is not appreciably affected by standard groundwater extraction techniques. Extraction wells will be installed and a field test will be conducted to complete the installation. Extracted groundwater will be discharged to the POTW at the Site as it has been in the past. Extracted vapors will be treated by carbon and the treated air discharged to the atmosphere under a permit from the Bay Area Air Quality Management District (BAAQMD). Once on-site contaminant mass and concentrations are reduced to the point that cleanup goals will not be exceeded at the point of compliance for the Facility (expected within 12 to 18 months), the treatment system will be shut down.

Groundwater will continue to be monitored using existing monitoring wells until it is confirmed that the cleanup goals have been achieved at the Site. Unused groundwater monitoring wells will be properly abandoned in accordance with the requirements of the Contra Costa County Environmental Health Services.

9.4 Alternative 4 – Excavation of Soil with Supplemental Groundwater Extraction

This alternative combines the use of soil excavation to remove contaminants in saturated soil with groundwater extraction to control migration of groundwater in the excavation. The excavated soil will be hauled off-site in trucks and disposed as non-hazardous material at a Class-II landfill. Extracted groundwater will be discharged to the POTW at the Site as it has been in the past. Once on-site contaminant mass and concentrations are reduced to the point that cleanup goals will not be exceeded at the point of compliance for the Facility, the treatment system will be shut down.

Groundwater will continue to be monitored using existing monitoring wells until it is confirmed that the cleanup goals have been achieved at the Site. Unused groundwater monitoring wells will be properly abandoned in accordance with the requirements of the Contra Costa County Environmental Health Services.

Hazardous wastes and soil around the former ponds were already excavated and properly disposed of. The excavated pits were backfilled with clean soil and covered

with layers of gravel, soil and bentonite (clay material) caps. Groundwater extraction was also implemented at the Site for nine years and has reached its technical limitation for reducing the concentration of TMTHF and benzene in groundwater.

10. Evaluation of Proposed Remedy and Alternatives

10.1 Evaluation of Alternatives

DTSC evaluates corrective measures alternatives based on the following four general standards for corrective measures (1-4) and five selection decision factors (5-9):

The nine criteria for evaluating corrective measure alternatives are as follows:

1) Overall protection of human health and the environment

2) Attain media cleanup standards

3) Control the sources of releases

4) Comply with standards for management of wastes

5) Long-term reliability and effectiveness

6) Reduction of toxicity, mobility or volume of wastes

7) Short-term effectiveness

8) Implementability

9) Cost.

The following table summarizes the comparative analysis of the four proposed alternatives.

Comparative analysis of four corrective measure alternatives				
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative4**
	No Further Action	**Monitored Natural Attenuation with Groundwater Extraction**	**Dual-phase Extraction (DPE)**	**Excavation with supplemental groundwater extraction**
Four general standards for corrective measures				
1. Overall protection of human health and the environment	No. Overall protection cannot be confirmed.	Yes. Overall protection can be achieved by reducing contaminants via in situ process	Yes. Overall protection will be achieved by extracting contaminant mass.	Yes. Overall protection will be achieved by removing contaminant mass.
2. Attain media cleanup standards	No. Attainment of cleanup goals cannot be confirmed	Yes. Benzene can be degraded to non-toxic compounds; groundwater extraction may eventually reduce TMTHF	Yes. DPE has proven capable of reducing VOCs in soil and groundwater	Yes. Removing source in saturated soil and groundwater may eventually reduce TMTHF concentrations to below cleanup goals.
3. Control the sources of releases	No. The alternative does not control the sources of release.	Yes. Benzene can be controlled and reduced; but TMTHF source may not be effectively controlled.	Yes. DPE has proven capable of removing VOCs mass above free groundwater by extracting impacted capillary-fringe water that contains dissolved contaminants.	Yes. Contaminant sources in low-permeability saturated soil will be removed by excavation.
4. Comply with standards for management of wastes	Yes. The alternative will not generate wastes to be managed.	Yes. The groundwater will be discharged according to the POTW permit.	Yes. Vapor will be treated according to BAAQMD permit. Groundwater will be discharged according to POTW permit	Yes. Removed soil will be sent to appropriate landfills. Groundwater will be discharged according to POTW permit.

Comparative analysis of four corrective measure alternatives				
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
	No Further Action	**Monitored Natural Attenuation with groundwater extraction**	**Dual-phase Extraction**	**Excavation and groundwater extraction**
Five selection decision factors	Relative score 1- 4 is assigned 4 = relatively high effective or low cost			
5. Long-term reliability and effectiveness		Relative Score = 2 Attenuation of Benzene is well established. TMTHF is not relatively degradable.	Relative Score = 4 DPE has proven to be effective in reducing VOC mass permanently.	Relative Score = 3 Contaminants can be excavated; but excavation may cause contaminants releases into groundwater.
6. Reduction of toxicity, mobility, or volume of wastes		Relative Score = 2 Degradation of Benzene to non-toxic compounds is well established; but not TMTHF.	Relative Score = 3 DPE can reduce contaminant volume but not toxicity, mobility.	Relative Score = 3 Excavation can reduce contaminant volume but not toxicity, mobility. Excavation may cause mixing of contaminants and shallow groundwater
7. Short-term effectiveness		Relative Score = 2 Degradation of Benzene to non-toxic compounds is well established; but not TMTHF. No construction or excavation to expose contaminants to workers.	Relative Score = 4 It takes 4 months to construct the unit. The unit can achieve the cleanup goal for TMTHF in groundwater within 12 -18 months.	Relative Score = 2 Excavation is relatively quick for achieving permanent reductions in residual contaminant mass. But excavation may damage utilities (fuel pipelines, etc.) and expose workers to contaminants;

Comparative analysis of four corrective measure alternatives				
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
	No Further Action	**Monitored Natural Attenuation with groundwater extraction**	**Dual-phase Extraction**	**Excavation and groundwater extraction**
Five selection decision factors	Relative score 1- 4 is assigned 4 = relatively high effective or low cost			
8. Implementability		Relative Score = 3 Groundwater well network is in place; but needs minor period maintenance	Relative Score = 3 Equipment is readily available, but energy requirement is relatively high.	Relative Score = 1 Excavation would be disruptive to onsite business operation, require significant engineer control to prevent damage to storm drains, aboveground fuel system, and underground petroleum pipeline
9. Cost		Relative Score = 3 $636,000	Relative Score = 4 $354,000	Relative Score = 1 $742,000
Total Score in Selection		12	18	11

10.2 Recommended Alternative

Alternative 3, the dual-phase extraction (DPE), is the preferred technology to properly remove the residual concentration of TMTHF in groundwater at a small area in between the former Ponds 1 and 2. This recommendation is made after careful consideration of the site data.

The significant benefit of DPE is the relatively rapid achievement of the remedial goals by aggressively removing the contaminant mass from the subsurface in a shorter period of time. As indicated above in the table of comparative analysis of four corrective measures alternatives, the dual-phase extraction remediation system will be designed to achieve the cleanup goal for TMTHF in groundwater within a period of 12 to 18 months. After implementing the dual-phase extraction, a total of five years of groundwater site monitoring will be conducted to gather sufficient information to justify termination of all post-closure activities, including groundwater monitoring at the site. Statistical analysis of the data from groundwater sampling will be evaluated and described in detail in a Corrective Measures Implementation (CMI) report.

Although this remedy will also remove benzene that may be present in the subsurface of the remediation area, the area where benzene has been detected in on-site groundwater (well W-40) is not targeted for dual-phase extraction. Natural attenuation will continue to occur and remediate benzene from on-site sources until the cleanup goal (the MCL of 1 ug/L) is achieved at the site.

The implementation of proposed remedies including DPE along with the land use covenant (LUC) will be protective of human health and the environment. The LUC and annual inspection will ensure that future land use will be restricted to industrial and commercial only.

The DPE will result in reduction of mass and concentration of TMTHF in on-site groundwater which will eventually result in reductions in TMTHF concentrations in off-site groundwater. Since TMTHF concentrations detected from off-site groundwater are below the potable-use preliminary remedial goal (PRG) and below the levels that are generally of concern to potential overlying ecological receptors, there are no corrective measures proposed for TMTHF in groundwater in off-site locations.

11. Public Participation

The Facility has submitted several reports regarding the Site, most importantly:

- RCRA Facility Investigation (RFI) Report dated May 12, 1995;
- Health Risk Assessment Report (Update and Revision) dated March 2004;
- Technical Memorandum – Update to the RFI Relative to Dioxin and Dibenzofuran Compounds in Groundwater at the Crompton Facility, dated April 29, 2005;
- Technical Memorandum – Update to the Risk Assessment Relative to Dioxin and Dibenzofuran Compounds in Groundwater at the Crompton Facility, dated May 6, 2005;
- Draft Corrective Measures Study Report, dated May 2005; and
- Land Use Covenant Implementation and Enforcement Plan.

DTSC conducted technical review of the reports listed above and found them to contain complete and technically accurate information. DTSC has determined that the remedy selection and approval of the CMS are exempt from the California Environmental Quality Act process because the proposed remedy qualifies for a categorical exemption as described in the California Code of Regulations, Title 14, Division 6, Chapter 3, Article 19, Section 15330.

DTSC is now formally soliciting public comments on these documents during a 45-day comment period. If DTSC approves the CMS and the proposed remedies discussed in the CMS Report and the Land Use Covenant Implementation and Enforcement Plan (LUC I&E Plan), Chemtura would be authorized to implement the remedies selected and the LUC will be entered between DTSC and the current property owner, Durkee Properties, LLC. The public comment period begins on August 11, 2006 and ends on September 26, 2006.

Public input on the proposed corrective action remedies for groundwater and on the information that supports the selection of the remedy and the LUC I&E Plan is an important contribution to the selection process. After DTSC receives all public comments, DTSC will make the final remedy determination. The final remedy selected could be different from the ones that have been proposed by the Facility and the current property owner, depending on the information that is received through the public participation process.

The CMS Report, RFI Report, Health Risk Assessment Report (Update and Revision), Technical Memoranda and the LUC I&E Plan which were used as the source of information for this Statement of Basis and other documents are available for review at:

City of Richmond - Main Library
Reference Desk
325 Civic Center Plaza
Richmond, California 94804.

The complete administrative records will be available for public review at:

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
700 Heinz Avenue
Berkeley, California 94710
(510) 540-3800

In addition, the Statement of Basis is also available on the DTSC website at:

http://www.dtsc.ca.gov/HazardousWaste/

To be considered in the decision making for this Project, all comments on the draft CMS Report, the proposed remedies and the LUC I&E Plan should be received, at the following address by September 26, 2006.

Cherry Padilla, Project Manager
Hazardous Substances Scientist
Standardized Permitting and Corrective Action Branch
Department of Toxic Substances Control
700 Heinz Avenue, Suite 300
Berkeley, California 94710-2721

To obtain additional information or have questions regarding the former Witco Facility, the following individuals should be contacted:

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(510) 540-3967

Mr. Raman Iyer
Director, Environmental Affairs and Remediation
Chemtura Corporation
Middlebury, CT 06749
(203) 573-2353

12. Key References

1. United State Environmental Protection Agency (U.S. EPA). *RCRA Facility Assessment (RFA) Report* Witco Corporation, 850 Morton Avenue, Richmond, California, EPA ID CAD 009137779. March 1989.

2. California Regional Water Quality Control Board – San Francisco Bay Region (RWQCB). *Waste Discharge Requirements – Order No. 90-026.* Witco Chemical Corporation, U.S. Peroxygen Division, Richmond, Contra Costa County. February 21, 1990.

3. Department of Toxic Substances Control (DTSC). *Hazardous Waste Facility Permit* Witco Corporation, 850 Morton Avenue, Richmond, California, EPA ID CAD 009137779, July 13, 1992.

4. Department of Toxic Substances Control (DTSC). *Consent Order* (HWCA 98/99-0004). Witco Corporation, 850 Morton Avenue, Richmond, California, EPA ID CAD 009137779, May 19, 1999.

5. Groundwater Technology, Inc. *Final RCRA Facility Investigation Report,* Witco Corporation, 850 Morton Avenue, Richmond, California, EPA ID CAD 009137779. May 12, 1995.

6. Groundwater Technology, Inc. *Final RCRA Corrective Measures Study Work Plan,* Witco Corporation, 850 Morton Avenue, Richmond, California, EPA ID CAD 009137779. April 24, 1996.

7. Shaw Environmental, Inc. *Health Risk Assessment Report (Update and Revision),* Former Crompton Facility, 850 Morton Avenue/3655 Collins Avenue, Richmond, California. March 2004.

8. Shaw Environmental, Inc. *Technical Memorandum – Update to the RFI Relative to Dioxin and Dibenzofuran Compounds in Groundwater at the Crompton Facility,* 850 Morton Avenue/3655 Collins Avenue, Richmond, CA. April 29, 2005.

9. Shaw Environmental, Inc. *Technical Memorandum - Update to the Risk Assessment Relative to Dioxin and Dibenzofuran Compounds in Groundwater at the Crompton Facility,* 850 Morton Avenue/3655 Collins Avenue, Richmond, CA. May 6, 2005.

10. Shaw Environmental, Inc. *Draft RCRA Corrective Measures Study Report. Crompton Corporation,* 850 Morton Avenue/3655 Collins Avenue, Richmond, CA. May, 2005.

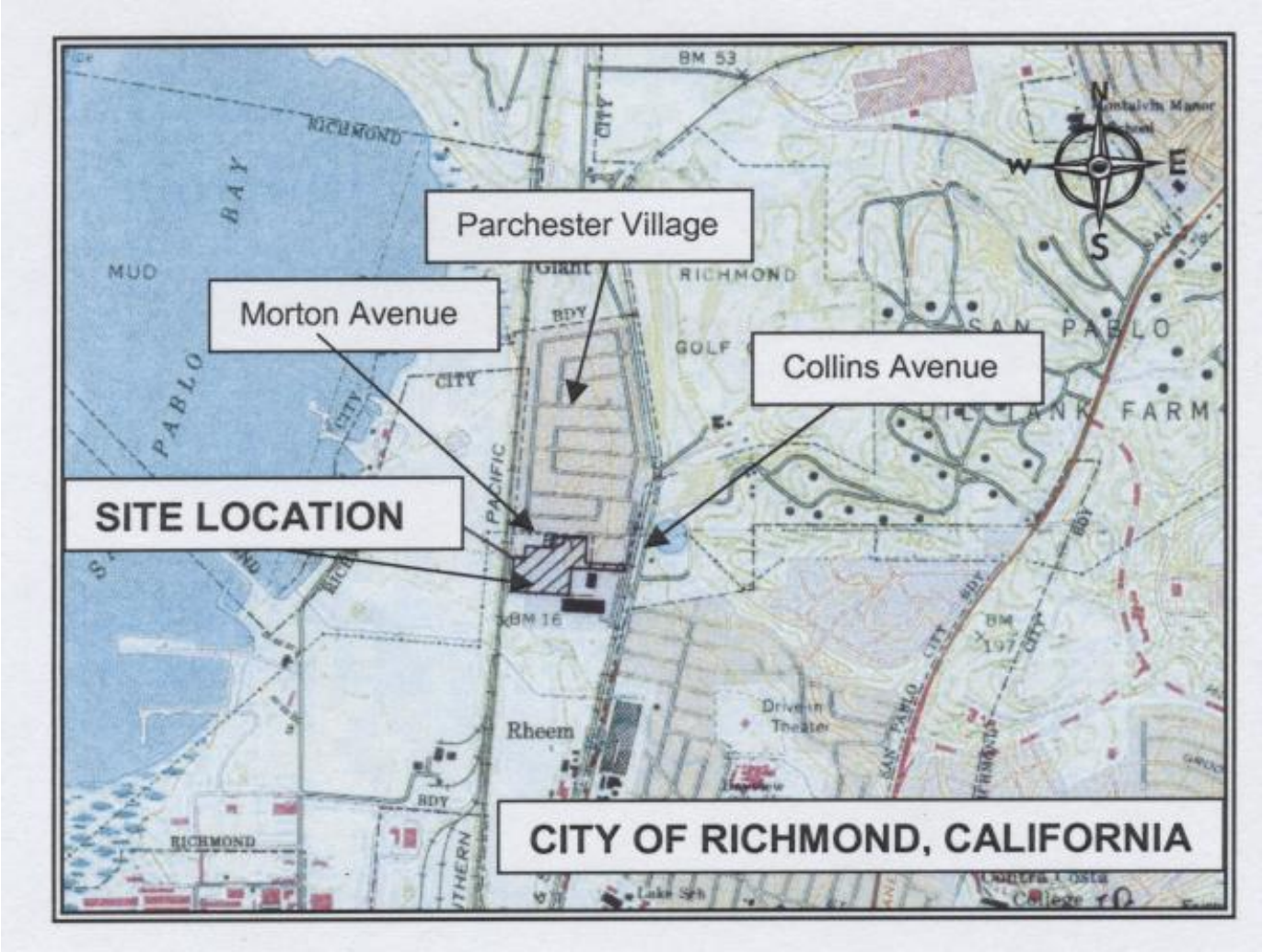

Figure 1. Site Location Map

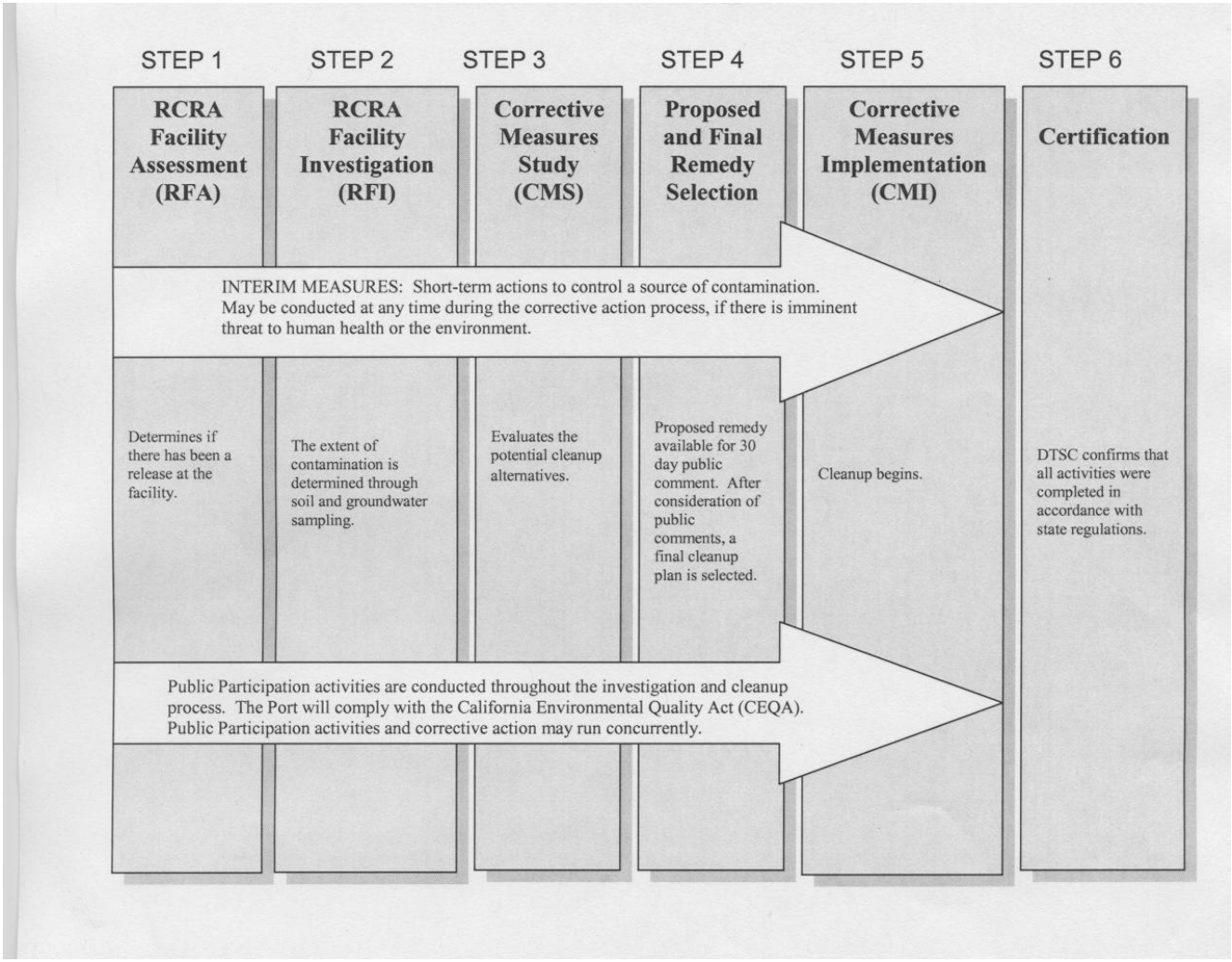

Figure 2. Corrective Action Process Flow Diagram.

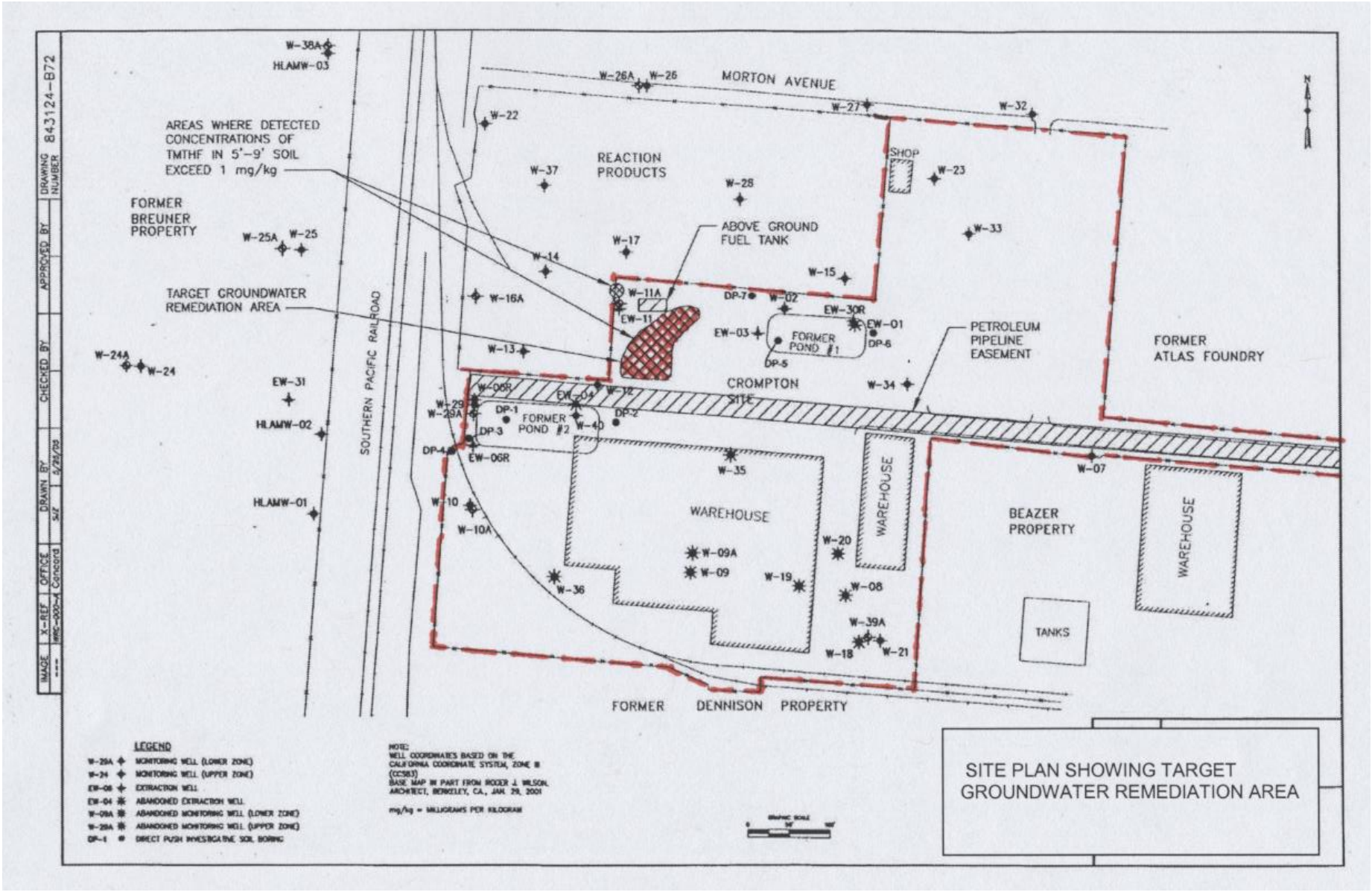

Figure 3. Site Plan Showing Target Groundwater Remediation Area.

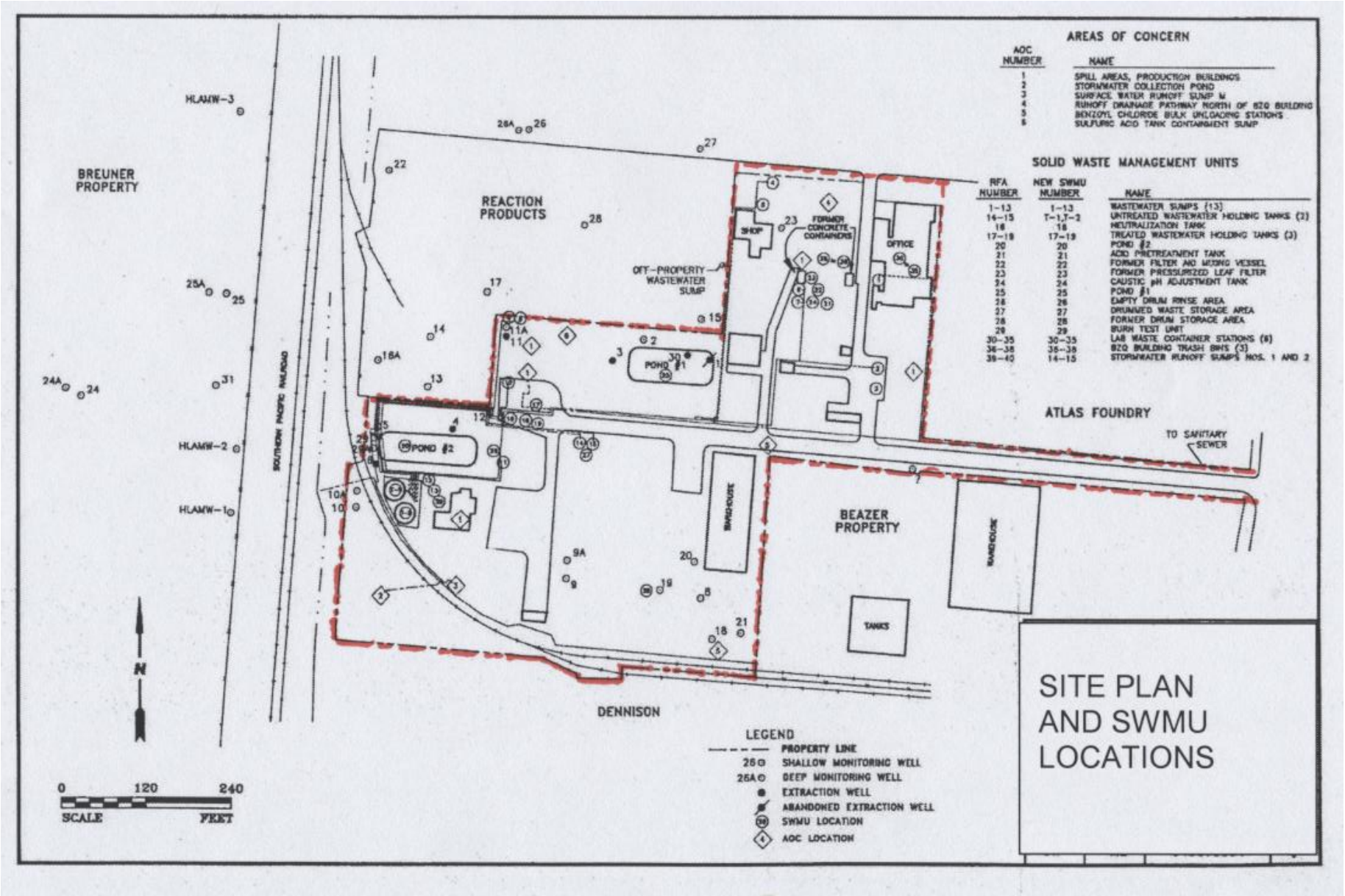

Figure 4. Site Plan and SWMUs Location

Table 1 - SWMUs and AOCs

RFA- SWMU/AOC #	Modified SWMU/AOC #	ISD Unit	Name
SWMU #			
1- 13	1-13	N	Wastewater Sumps (13)
14-15	T-2 and T-1	N	Untreated Wastewater Holding Tanks (2)
16	16	N	Neutralization Tank
17-19	17-19	N	Treated Wastewater Holding Tanks (3)
20	20	Y	Pond 2
21	21	Y	Acid Pretreatment Tank
22	22	Y	Former Filter Acid Mixing Vessel
23	23	Y	Former Pressurized Leaf Filter
24	24	Y	Caustic pH Adjustment Tank
25	25	Y	Pond 1
26	26	N	Empty Drum Rinse Area
27	27	N	Drummed Waste Storage Area
28	28	N	Former Drum Storage Area
29	29	N	Burn Test Unit
30-35	30-35	N	Lab Waste Container Stations (6)
36-38	36-38	N	BZQ building Trash Bins (3)
39-40	14 and 15	N	Storm Water Runoff Sumps #1 and #2
AOC #			
1	1	N	Spill Areas, Production Buildings
2	2	N	Storm Water Collection Pond
3	3	N	Surface Water Runoff Sump M
4	4	N	Runoff Drainage Pathway North of BZQ Building
5	5	N	Benzoyl Chloride Bulk Unloading Stations
6	6	N	Sulfuric Acid Tank Containment Sump

Table 2. TMTHF Level in the Upper and Lower Water-Bearing Zones at the former Witco Facility and Vicinity from 1993 to 2005														
		1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TMTHF (ug/L) in the Upper Water-Bearing Zone at the Former Witco Site														
W-2	Low	180	ND	150	150	21	110	70	150	85	130	62	32	48
	High	260	280	250		280	180	170			150	69	90	48
	Average	215	169	213		170	150	121			140	66	61	48
W-3/EW-03	Low	14	12	ND	ND	ND	ND	ND	14	ND	13	ND		
	High	53	54	20	ND	ND	38	39	14	ND	13	38		
	Average	30	27	2	ND	ND	9.63	14.48	14	ND	13	18		
W-4/EW-04	Low	98	22	24	360	69	84	ND	66	690				
	High	590	496	470	470	780	1800	735	730					
	Average	390	267	246	400	542	453	250	398					
W-05/W-05R	Low	49	ND	11	17	ND	9.7	7.47	ND	ND	ND	4.5	76	
	High	74	55	30		24	28	22			ND	56		
	Average	64	31	22		8	18	16			ND	30		
W-06/EW-06/EW-6R	Low	ND	23	66	94	100	49	14.8	420	ND	ND	ND	1.9	ND
	High	320	170	220	110	460	320	340		220	32	1	6.6	ND
	Average	215	100	106	105	193	153	107		112	26	1	3	ND
W-07	Low			ND	ND	ND	ND	ND	ND			ND	ND	
	High			ND		ND	ND	ND					7.5	
	Average			ND		ND	ND	ND					38	
W-08	Low	ND	ND	ND										
	High	ND	ND	ND										
	Average	ND	ND	ND										
W-09	Low	ND	ND	ND	ND	ND	ND	ND	ND					
	High	ND	ND	ND		ND	ND	ND						
	Average	ND	ND	ND		ND	ND	ND						
W-10	Low	ND	5	74		ND	16	7.2		ND	ND	ND	ND	
	High	33	100	91		25	22	15		7.8	ND	ND		
	Average	20	68	81		16	18	11		3.8	ND	ND		
W-11/ EW-11	Low	640	570	610	720	670	120	ND		310	ND	ND	360	400
	High	1700	**2700**	1900	930	**3000**	**16000**	2100		1300	1400	940	420	790
	Average	1137	1471	1140	803	1841	**2545**	1397		805	1195	523	390	595

Table 2. TMTHF Level in the Upper and Lower Water-Bearing Zones at the former Witco Facility and Vicinity from 1993 to 2005														
		1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TMTHF (ug/L) in the Upper Water-Bearing Zone at the Former Witco Site														
W-12	Low	1100	ND	190	660	750	1200	510	1800	270	1200	ND	1100	560
	High	**2400**	1600	630		1100	**2900**	**2500**		1800	**2300**	**2900**	1300	1600
	Average	1475	1035	335		1050	2025	1455		767	1750	1935	1200	1008
W-13	Low	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND		
	High	ND		ND	ND	ND	2			6	ND			
	Average	ND		ND	ND	ND	ND			3	ND			
W-14	Low	ND	ND	ND	ND	ND	ND	ND	ND			ND	ND	
	High	ND	ND	ND	ND	ND	ND	ND				ND		
	Average	ND	ND	ND	ND	ND	ND	ND				ND		
W-15	Low	ND	63	ND	ND	8.2	ND	ND	ND		ND	ND	ND	
	High	57	110	88	ND	33	ND	10.1				ND		
	Average	26	91	42	ND	23	ND	5				ND		
W-17	Low	310		65		60	86	85.3	480	270	ND	380	710	950
	High	850		380		260	300	360		490	490	520	970	1100
	Average	615		173		140	212	191		370	288	447	840	1025
W-18	Low		ND											
	High		ND											
	Average		ND											
W-19	Low		ND											
	High		ND											
	Average		ND											
W-20	Low		ND											
	High		ND											
	Average		ND											
W-21	Low		ND											
	High		ND											
	Average		ND											
W-22	Low	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	High	38	ND	ND		ND	ND	ND		ND		ND		
	Average	13	ND	ND		ND	ND	ND		ND		ND		
W-23	Low	ND	ND	ND	ND	ND	ND	ND	ND					
	High	ND	ND	ND		ND	ND	ND						
	Average	ND	ND	ND		ND	ND	ND						

Table 2. TMTHF Level in the Upper and Lower Water-Bearing Zones at the former Witco Facility and Vicinity from 1993 to 2005															
		1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TMTHF (ug/L) in the Upper Water-Bearing Zone at the Former Witco Site															
W-28	Low	34	40	42	49		45	34.1	53	46	64	76	59	60	
	High	50	56	56			55	53				82		60	
	Average	42	46	49			50	43				79		60	
W-29	Low	ND	ND	ND	ND		ND	ND	ND	ND		ND	ND		
	High	14	ND	6.2			ND	ND	ND	ND		0.8	ND		
	Average	7	ND	2			ND	ND	ND	ND		0.4	ND		
W-30/ EW-30/ EW-30R	Low		ND	ND	ND	ND	ND	ND	ND	15	7		ND	66	
	High		130	82	31	9.4	15	57	77				42		
	Average		27	36	4	3	4	23	25				15		
W-33/ W-33R	Low		-	12	ND	ND		ND	ND	8.8				1.5	
	High		-	180	6.7			6.3	2.7						
	Average		-	96	2			3	1						
W-34	Low		-	ND	ND	ND	ND	ND	ND	ND					
	High		-	ND	ND		ND	ND	ND						
	Average		-	ND	ND		ND	ND	ND						
W-35	Low		-	ND	ND	ND	ND	ND	ND	ND					
	High		-	ND	5.6		ND	ND	ND						
	Average		-	ND	1		ND	ND	ND						
W-36	Low		-	ND	ND	ND	ND	ND	ND	ND					
	High		-	ND	ND		ND	ND	ND						
	Average		-	ND	ND		ND	ND	ND						
W-37	Low		-	10	ND	11	8.9	7.6	ND	7.5	ND	ND	ND	1.7	ND
	High		-	13	15		14	13	10				4.4		ND
	Average		-	12	10		11	11	3				3		ND
W-40	Low											150	ND	34	28
	High												130		31
	Average												65		30
TMTHF (ug/L) in the Upper Water-Bearing Zone of the Former Beazar Property (East of former Chemtura Site)															
W-07	Low		ND	ND											
	High		ND	ND											
	Average		ND	ND											

Table 2. TMTHF Level in the Upper and Lower Water-Bearing Zones at the former Witco Facility and Vicinity from 1993 to 2005															
		1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TMTHF (ug/L) in the Upper Water-Bearing Zone Close to Former Denison Property (South of former Witco Site)															
W-39	Low														
	High														
	Average														
TMTHF (ug/L) in the Upper Water-Bearing Zone at the Former Breuner Property (West of Former Witco Site)															
W-24	Low				ND		ND	ND			ND		ND	ND	
	High				ND		ND	ND					ND		
	Average				ND		ND	ND					ND		
W-25	Low		ND	ND	ND		ND	32	ND		ND		ND	ND	
	High		16	30	22		54	140	36				0.7		
	Average		11	10	11		27	86	17				3		
EW-31	Low		180	150	67	54	11	12	ND		ND		ND	ND	
	High		389	380	110	64	40	54	18.4				ND	ND	
	Average		250	191	91	60	24	28	10				ND	ND	
HLAMW-1	Low														
	High														
	Average														
HLAMW-2	Low										ND		ND	64	
	High												120	81	
	Average												63	73	
HLAMW-3	Low														83
	High														83
	Average														83
TMTHF (ug/L) in the Upper Water-Bearing Zone at the Morton Avenue (North of former Chemtura Site)															
W-26	Low		ND	ND	ND	ND		ND	ND	ND				ND	
	High		ND	ND	ND			ND	ND						
	Average		ND	ND	ND			ND	ND						
W-27	Low		ND	ND	ND	ND		ND	ND						
	High		ND	ND	ND			ND	ND						
	Average		ND	ND	ND			ND	ND						
W-32	Low		-	ND	ND	ND		ND	ND	ND					
	High		-	ND	ND			ND	ND						
	Average		-	ND	ND			ND	ND						

Table 2. TMTHF Level in the Upper and Lower Water-Bearing Zones at the former Witco Facility and Vicinity from 1993 to 2005														
		1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TMTHF (ug/L) in the Lower Water-Bearing Zone at the Former Witco Site														
W-9A	Low			ND	ND	ND	ND	ND	ND					
	High			ND		ND	ND	ND						
	Average			ND		ND	ND	ND						
W-10A	Low			ND	ND	NND	ND	ND	ND	ND		ND	ND	
	High			ND		ND	ND	ND	ND			ND	ND	
	Average			ND		ND	ND	ND	ND			ND	ND	
W-11A	Low			ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	
	High			ND		5.1	ND	ND	ND			ND	ND	
	Average			ND		2	ND	ND	ND			ND	ND	
W-16A	Low	ND	15	68	58	83	63	71	94	ND	ND	56	190	170
	High	260	170	350		110	100	98		97	ND	180	190	170
	Average	116	112	150		95	77	88		24	ND	118	190	170
W-24A	Low			ND		ND	ND	ND						
	High			ND		ND	ND	ND						
	Average			ND		ND	ND	ND						
W-25A	Low	8	ND	ND			6.2	ND		5.7		ND	2.3	
	High	10	ND	ND			9.9	10.8				7.8		
	Average	9	ND	ND			8	7				4		
W-26A	Low	ND	ND	ND	ND		ND	ND	ND	ND		ND	ND	
	High	ND	7	ND			ND	ND						
	Average	ND	5	ND			ND	4						
W-29A	Low	ND	ND	ND	ND		ND	ND	6.7	ND		ND	2.8	
	High	10	ND	ND			100	8.05						
	Average	6	ND	ND			27	5						
W-38A	Low			ND		ND	ND	ND		ND		ND	< .5	
	High			ND		ND	6.5	ND				ND		
	Average					ND	3					ND		
W-39A	Low									ND				
	High													
	Average							ND						

Table 3 Post-IRM COCs Detected in On-Site Groundwater

	Frequency of Detection		Minimum Detected Concentration			Maximum Detected Concentration		
Chemical	Detected	Total	Conc. mg/L	Location	Sample date	Conc. mg/L	Location	Sample date
1,4-Dioxane	2	22	0.0032	W-02	1/23/2003	0.024	W-40	2/3/2003
Benzene	4	77	0.0011	W-40	3/25/2003	0.11	W-40	9/18/2002
Bis(2-ethylhexyl)phthalate	9	42	0.011	W-09A	12/18/2000	0.04	EW-06	12/18/2001
Chlorobenzene	4	78	0.001	W-12	2/3/2003	0.0018	EW-03	6/28/2001
Cis-1,2-Dichloroethene	13	78	0.0022	EW-30	2/3/2003	0.18	W-23	06/28/2000
Isopropylbenzene	8	78	0.0005	W-02	1/23/2003	0.058	W-40	9/18/2002
Para-Isopropyl Toluene	1	13				0.001	W-40	2/3/2003
Tetrachloroethene	6	79	0.003	W-23	9/20/2000	0.01	W-23	06/28/2000
2,2,5,5-TMTHF	72	80	0.0005	multiple	multiple	2.9	W-12	12/19/2003
Trichloroethene	9	78	0.0031	W-34	9/28/2001	0.014	W-23	06/28/2000
Vinyl Chloride	3	78	0.0025	W-23	9/20/2000	0.0046	W-23	06/28/2000

Notes:

2,2,5,5-TMTHF is 2,2,5,5-tetramethyl-tetrahydrofuran.

Conc. mg/L is chemical concentration in milligrams per liter groundwater.

COC is constituent of concern.